

NAVAL POSTGRADUATE SCHOOL

Monterey, California



19980727 027

THESIS

**IMPLEMENTATION OF
INFORMATION TECHNOLOGY IN THE FREE TRADE
ERA FOR INDONESIA**

by

Sinulingga Minan

June 1998

Thesis Advisor:

William James Haga

Approved for public release; distribution is unlimited.

DTIC QUALITY INSPECTED 1

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE June 1998		3. REPORT TYPE AND DATES COVERED Master's Thesis
4. TITLE AND SUBTITLE IMPLEMENTATION OF INFORMATION TECHNOLOGY IN THE FREE TRADE ERA FOR INDONESIA			5. FUNDING NUMBERS	
6. AUTHOR(S) Sinulingga Minan				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT (<i>maximum 200 words</i>) <p>During the 1990s and the early in the twenty-first century, the management of information technology in enterprises will undergo a revolutionary change in Indonesia. Previous changes were evolutionary and largely driven by advance in technology; the introduction of operating systems in the 1960s, the introduction of the minicomputer in the 1970s, and the introduction of personal computers in the 1980s. Now, both technology and business direction are driving information technology management to a fundamentally new paradigm.</p> <p>Information technology is no longer exclusive for the information systems specialists. Line business managers increasingly take responsibility for information technology decisions, as computing and telecommunication is becoming more and more universal.</p> <p>By understanding all changes that may transform management and information systems, managers can anticipate possible weaknesses in their organizations. Given this phenomenon, managers need detailed information and a substantial source of references they can utilize to make decisions.</p> <p>This thesis explores a new paradigm of information system management from Indonesia's management perspective. Alternative approaches to solve a number of major problems that may help foreign investors to understand the business environment and culture will encourage Indonesian and foreign enterprises to invest in information technology.</p> <p>While this thesis is proposed for Indonesian future managers, it is also structured as a reference for decision making of information technology outsourcing based on the Indonesian culture, and possibly other Asian cultures.</p>				
14. SUBJECT TERMS Implementation of Information Technology (IT) in the free trade era for Indonesia.			15. NUMBER OF PAGES 82	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

Approved for public release; distribution is unlimited

**IMPLEMENTATION OF INFORMATION TECHNOLOGY IN THE FREE
TRADE ERA FOR INDONESIA**

Sinulingga Minan
Captain, Indonesian Army
Indonesian Military Academy, 1987

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

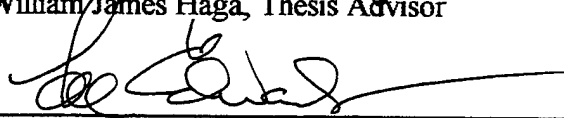
**NAVAL POSTGRADUATE SCHOOL
June 1998**

Author: 

Sinulingga Minan

Approved by: 

William James Haga, Thesis Advisor


Lee Edwards, Associate Advisor


Reuben T. Harris, Chairman
Department of Systems Management

ABSTRACT

During the 1990s and early in the twenty-first century, the management of information technology in enterprises will undergo a revolutionary change in Indonesia. Previous changes were evolutionary and largely driven by the advancement in technology such as: the introduction of the operating systems in the 1960s, the introduction of the minicomputer in the 1970s, and the introduction of personal computers in the 1980s. Now, both technology and business directions are driving information technology management to a fundamentally new paradigm.

Information technology is no longer exclusive for the information systems specialists. Line business managers increasingly have taken responsibility for information technology decisions, as computing and telecommunication is becoming more and more universal.

By understanding all the changes that may transform management and information systems, managers can anticipate possible weaknesses in their organizations. Given this phenomenon, managers need detailed information and a substantial source of references they can utilize to make decisions.

This thesis explores a new paradigm of information system management from the Indonesian's management perspective. Alternative approaches to solve a number of major problems that may help foreign investors understand the business environment and culture will encourage Indonesian and foreign enterprises to invest in information technology.

While this thesis is proposed for Indonesian future managers, it is also structured as a reference for decisions making of information technology outsourcing based on the Indonesian culture, and possibly other Asian cultures.

TABLE OF CONTENTS

I.	INTRODUCTION	1
A.	INFORMATION TECHNOLOGY EVOLUTION IN INDONESIA.....	4
1.	Decades of the 1940s and 1950s.....	6
2.	Decades of the 1960s and 1970s.....	6
3.	Decades of the 1980s and 1990s.....	7
B.	BUSINESS ENVIRONMENT	10
1.	IT Opportunity in Indonesia culture	11
2.	Investment	13
3.	Cultural Problem	15
C.	INDONESIA'S GOAL IN APPROACHING THE 21 ST CENTURY.....	17
1.	Development Halt	18
2.	Some Strategies	19
3.	The National Ideals	21
II.	BACKGROUND	23
A.	DEVELOPMENT AND TRANSFER TECHNOLOGY	24
B.	MULTINATIONAL CORPORATION VERSUS FAMILYBUSINE.....	27
1.	Decision in Multi-corporation Business	28
2.	Family Business Decision Process	29
C.	IT FRAMEWORK	31
1.	Business Readiness	32
2.	Business Vision	33
3.	Solution Design	33
4.	Solution Development	33
5.	Solution Deployment	33
D.	THE IMPORTANCE OF INFORMATION	34
1.	Needs for Information	34
2.	Limitation of Network and Database	35
III.	RESEARCH ANALYSIS AND OUTSOURCING	37
A.	SUPPORTIVE BASES	38
B.	SYSTEM AVAILABLE (APPLICATION OPTIONS)	43
1.	Network Types	44
2.	Network Topologies	45
C.	APPROACHES	51
1.	Decision Making Software	55
2.	The Weight Sum Approach	58
D.	INFORMATION SECURITY ISSUE	62
1.	Risk Acceptance Process	63
2.	Information Security Policy Consideration	64
IV.	CONCLUSION	67
A.	SUMMARY	67
B.	RECOMMENDATION	69
	BIBLIOGRAPHY	71
	INITIAL DISTRIBUTION LIST	73

I. INTRODUCTION

The monetary crisis, which began in July 1997, has drastically changed the Indonesian economic situation and has thrown the Indonesian financial viability into the depth of a recession. The unexpected crisis has turned a good economic record into a series of accumulated mistakes during a half-century development process. Nevertheless, the economic successes of the Asia-Pacific region have been well-documented, and Indonesia has been a cornerstone in contributing to the region's impressive growth figure (The Laurasian Institution, 1995). Indonesia's internal decade-long campaign to deregulate and reform its economy has registered some impressive results. Domestic economic growth had averaged almost seven-percent over the same period (Nomura Research Institute). Rich in natural resources, land and labor, Indonesia has the potential to sustain high growth rates for many years to come. The potential is very important to the country's development, which has been considered under developed and requires support from internal and external assets, such as human resources and technology.

More Indonesians now live in cities, where information about the world outside Indonesia's borders is more readily available. Advances in communication technology have hastened this process and to some extent carried it into rural Indonesia. Middle class professionals and white collar employees have been identified, and in many cases their interest have more in common with the salaried classes of Buenos Aires or Istanbul than with the farmers of Java's highlands (Adam Schwarz, 1994). This trend shows a recent gap within the society and demand for world class communication becomes far beyond its capability.

Indonesia's economic rapid growth strategy since independence from 1945 to 1996, an average of 7% and has taken the country through several successive phases; i.e.,

- 1950s and 1960s: Agricultural stabilization.
- During the 1970s: The replacement of imports with domestic products.
- Early 1980s: The reinvestment of revenues from oil and gas.
- 1990's: Indonesia has entered a new phase of economic maturity, based on opening its trade sectors to the world market and extending the reach of its banking and capital markets (Embassy of Indonesia Home Page in Ottawa, 1996).

Given Indonesia's goal to be a great nation, sooner or later the country must support development in all aspects, especially in rapid growth technology. Improvement in technology allows that costs have dropped by a factor of 10 each decade (Louis Fried, 1995). This momentum benefits Indonesia as a developing country to enhance its technology by lower costs.

Approaching the 21st century as one of the middle income countries, Indonesia emerges toward a new change in one aspect that is unavoidable, and gradually affects its development, and then is rapid growth of technology, especially Information Technology. Electronic Data Processing (EDP), as an integration of Information Technology, becomes important in the coming information era for Indonesia's development. Reality has indicated that the EDP, or personal computer (PC), is no a longer secondary nor exclusive tool, but it has become a primary need for information, economy enhancement, and social structure (Hussein Bidgoli, 1997). The situation enables extraordinary competition in the climate of businesses. Not only the free trade era of competition will become

increasingly crucial, but also continued globalization should be considered in the future expansion of business sectors.

Computers are central to all facets of automated information creation, dissemination, and utilization. Since the creation of the world's first computer, computer capabilities have improved dramatically. Enabled by improved microchips, today's computers are much faster, have much larger capacities, and are much more reliable than those that were used as recently as two years ago (Infokomputer, 1997). Within the information technology community, there is an agreement that computing capabilities will continue to expand. Many experts believe that early in the Twenty-First Century, high volume microprocessors will have cracked the so-called "bibs barrier" and will be able to execute over one billion operations per second (David S. Alberts, Daniel S. Papp, June 1997).

Whether business society likes it or not, change is being thrust upon businesses by a combination of technological, business and social factors. Some evidence of this change may be noted from consideration of: people focus, cost effectiveness, information dispersal, and business process redesign. Evidence that Information Technology is changing the manner in which organizations are structured, reengineered, and managed has already been experienced all over the world.

Dramatic changes have also occurred in the Indonesia business environment. Many information processor aspects have created new special features in businesses. Using base cultural, technology evolution, and prosperity levels in affording certain demands, it has been foreseen that Indonesia is expected to play a critical role in the competitiveness of business organizations. When introducing new technology, people

will learn how the new technology can be used to improve the economy and organizational performance in the business culture of Indonesia. Later, this aspect will be discussed in technology transformation and its impact for Indonesia.

Indonesian society today is significantly different from the society 30 years ago, understandably. These changes collectively have meant that Indonesia is moving toward a new society. This phenomena has a close relationship with political stability, where the policies of economic development and development opportunities are considered widely opened. During the next decade, the country is expected to need a competitive weapon at their command to achieve strategic goals (Asian Survey, May 1993). One of alternatives, and the most powerful, is Information Technology (IT). This has been proven in today's global competition and technological advances in businesses.

Business environments have been more competitive then ever, forcing companies to seek ways to improve efficiency, lower operating costs, be more responsive to customers, and bring new products to market faster. Without an information processing technology commitment, businesses lose a competitive advantage that superior technology confers. Therefore, corporations should understand how information technology could be applied. The meaning of this statement infers that knowledge of the potential application of the technology to the company's business processes, products, services, and industry is key (Louis Fried, 1995). Equally important is to have a clear perspective of the company's products or services and the major trends in the market.

A. INFORMATION TECHNOLOGY EVOLUTION IN INDONESIA

Management of IT resources and their support needs have, to a large extent, been influenced by newer and newer developments in technology. In the early days of IT,

support was at a local level by the people actually using these highly specialized machines. In trying to develop the appropriate model for the support of IT, especially in Indonesian businesses, it is necessary to briefly examine the development of IT and its means of support. Also, it is important to consider the evolution of IT itself, particularly from an Indonesian perspective.

At the same time, a larger and more applicable technology to commercial, general applications and computer centers were set up as a part of IT to concentrate on the large investment and the expertise needed to manage and support it. With the development of the personal computer, the "end user" became more responsible for providing direct support. Then, as computer networks (internet/intranet) developed, support again became more centralized. Now, the technology is such that there is a need for support at the user or "client" level for the many minor problems that may occur due to hardware, software or local networking problems in the work place, as well as, support from the network center by specialists. The support generally relates to strategic network systems and the individual corporate network. Central support services can also provide a valuable service by coordinating bulk or site software licenses, equipment purchases, setting procedures and standards to assist in standardization of data models and software interoperability (Business Center, 1997).

With the rapid introduction of operating systems and client/server applications, along with the impact of the Internet, companies have been forced to increase their IT training budgets just to keep up with technology (Mastering Press Release, 1998).

After 50 years of independence, it is important to look back at the IT evolution in Indonesia. The success and failure of IT in the past is very crucial, if it is to be used as a

reference in planning and having viewpoint to the future. It is interesting to note changes in IT that cover computer technology and communication then and now enriched by an audiovisual system. Compared to a historic overview of the computer industry, this evolution does not represent a complete picture of the entire system used either by government agencies or by corporate businesses in Indonesia. The purpose of a review of this evolution is to provide a general overview of how computers, as well as IT's rapid growth, compares to world growth, hence, a reference for Indonesia's response to the world's IT evolution.

1. Decades of the 1940s and 1950s

Computer usage was launched more than 50 years ago in Indonesia. In 1937, Government Rail Road Company used a punch card machine, an early computer, in Bandung, West Java. In the 1940s, Indonesian Army used an IBM Accounting Machine, the first computer generated machine in Jakarta and Bandung. In the 1950s, PT Stanvac in Sungai Gerong and the Pertamina an Oil Company owned by the government in Pangkalan Berandan, used second-generation computers for recording and analyzing crude oil processing. This was followed by BNI (Indonesia National Bank), which installed IBM computers for the financial processing of transactions. Meanwhile, BPS (Statistic Center Bureau) used UNIVAC computers for statistical computing and analysis.

2. Decades of the 1960s and 1970s

By the end of the 60s, several Government Companies and Government Institutions (Army, Police, Garuda Indonesia Airways, and Government Banks) started to use the third generation computers. At that time, Indonesia became the leading country in using IT, compared to neighbor countries. For example, the airline reservation system and

aircraft maintenance, through computer usage, had been organized before Thailand, Malaysia, and China. Also, use of computers for crude oil process applications, and marketing and seismic computing in Pertamina had been installed and in operation ahead of Taiwan, Malaysia, and Brunei. There are many examples of computer usage at that point of time; e.g., computerization in the Jakarta Province, Indonesia University, and the Bandung Technology Institute.

From the 60s to the 70s, Indonesia's pioneering efforts in IT usage had been acknowledged in Asia-Pacific. Indonesia had a large number of computer "experts" that gave computer training to professionals from other countries. Singapore, Hong Kong, Philippines, Thailand, Korea, Taiwan, Burma, and India professionals came to Indonesia to study computer applications and systems.

By that time, computer professional organizations, such as IPKIN-Information, Computer Association, and APNI- National Information Company existed. In an international forum, such as SEARCC-South East Asia Regional Computer Confederation, Indonesian computer experts were respected by most of the computer associations as leading experts.

3. Decades of the 1980s and 1990s

The Indonesia's successful era was gone and became backward because a rapid growth of computer technology does not belong to a certain country. From the 1980s to the present time, computer pioneers in Asia-Pacific has moved to other areas. Countries such as Singapore, Hong Kong, and South Korea had previously sent their computer experts to Indonesia to implement computerization in their country. Additionally, some countries like India, the Philippines, and China have been able to export software and

data recording platform to industrialized countries, such as the United States, Japan, and European countries. Exclusively, software and hardware marketing was dominated by Indonesia's neighbor countries (Infokomputer Magazine, Dec. 1997).

According to computer observers, the use of computers in Indonesia does not stop, but moves forward toward the future along with technology transformation. Many institutions such as Banks, Aircraft Industry (IPTN), Indonesia Satellite (INDOSAT), Telephone and Communication (TELKOM), Government Oil Company (PERTAMINA), and Meteorology & Geophysical, have been advanced in the use of computer technology. More than 100 computer installations, mainframes, units of mini computers, and millions of PCs are actively used in Indonesia presently. Almost all commercial computer's top-brands are found in the Indonesian electronic processing market. The industry is small, if it is compared to the country's population and number of computer users.

Interestingly, Indonesia has implemented ISDN technology since 1995. However, the need for this technology does not satisfy the need for technology improvement, because limited groupings of Indonesian society have gained knowledge of computer technology. Operational costs, which are very expensive, is not within reach financially for a majority the Indonesians. For example, on one hand the needs of communication in Jakarta are very high-almost similar to New York's needs. On the other hand, especially outside Jakarta, the need for such technology is considered low. For the Jakarta community, Indonesia is tardy in anticipating the technology evolution, while, for people who live outside Jakarta consider Indonesia too quick to accept such technology. This is a major challenge for the Indonesian government to anticipate. In order to win economic competition in the marketplace in this era, Indonesia must have the technology without

ignoring such constraints as: efficiency, effectiveness, funding, and the use of human resources.

Regarding the IT topic, it is essential to compare the evolution of personal computers throughout the world to Indonesia's IT evolution. Technology development can not be detached from the world's technology influence and strategies in business. Additionally, it is also necessary to mention telecommunication as a supportive means in promoting the IT rapid growth. An overview of telecommunication needs should be tracked in Indonesia as a consideration for the implementation of IT in the future.

The Indonesian telecommunications industry is undergoing a period of rapid growth, fueled by a rising standard of living, as well as, an increasing liberation of company ownership and shareholder structure. It is anticipated that over the next ten years, the industry will invest in excess of US\$ 15 billion in financing. This is an increase in mainline Tele-density from less than the current 2% to almost 6%, and a cellular Tele-density from 0.2% to around 1.4% (Telecommunication in Indonesia P.R.R, 1997).

According to the world's telecommunication survey, Indonesia is the only Southeast Asian country (except for Vietnam) which has a level of Tele-density (both cellular and fixed line) significantly below what is considered "optimum". Indonesia has the world's fourth largest population with 200 million people. Yet, telecommunication services are not yet at a considered acceptable level, when compared to other Asian countries. Indonesia has approximately 1.9 million line units for a penetration of only 1.5 telephones per 100 people. Nevertheless, government development programs are for continued deregulatory reform, as well as a greater focus on diplomatic effort and encouraging foreign direct investment in telecommunication. Indonesia offers one of the

most favorable regulatory and competitive environments in the Southeast Asian region. Indonesia is adopting a very co-operative approach, as well as limiting the number of players. The main policy is to ensure the continuing development of Indonesia's telecommunications. This is a good news for the IT community in Indonesia to ensure its implementation and to get assistance from a solid supportive base.

B. BUSINESS ENVIRONMENT

For the remainder of the 1990s and beyond, information technology will present perhaps more management challenges than ever to business. In order to build a logical view of information technology issues, it is necessary to divide the broad scope of this problem into two principal segments. The first segment is the supplier of information technology products and services; the second segment is the user of those products and services. Suppliers include computer manufactures, manufactures of computer-related products, system integrators, software package vendors, telecommunications carriers and value added network suppliers, among others. Users include manufacturers, financial service companies, government agencies, travel companies, and almost every other business imaginable.

Based on the two principal segments, there exists a need to examine Indonesia's market and its business environment. This is important because IT has become one integral part of the corporate infrastructure and has increasingly been recognized as a competitive weapon in such a struggle. Each step of technology change demands a major commitment of company funds toward planning, the acquisition of up-to-date equipment, and implementation expertise. Additionally, the implementation is a transformation that

could change users from those who work for companies, and who are going to apply the new technology.

Indonesia's economies are mainly dominated by family-owned companies and are normally operated in a patriarchal manner by the founder, or a member of the family. In this environment, employees have never been in a position to question the decisions of management, the family member is regarded as knowing what is best for the family, and therefore the company. His or her power and discretion are considered absolute. An employee is dependent on the leader's spirit among employees, which hampers employee creativity and initiative.

In recent years, many families-owned companies have rapidly grown and expanded their operations into new areas-beyond the limits of their management skill and financial capabilities. This sense of reality is gained when a professional manager enters an entrepreneurial family-owned company, he or she comes as an agent of change, usually to bring structure, management systems, and professional experience to the company (Tanri Abeng, 1997).

In the future, it is considered necessary for the company, not to just identify and undertake business opportunities, but to optimize and sustain them while managing risk in a most effective way. In the next decade or before, Indonesian companies that survive and succeed will be those that adopt sound management science practices and realize the strategic importance of information technology.

1. IT opportunity in the Indonesian Culture

Generally, corporate businesses in Indonesia realize the importance of Information Technology (IT) in supporting either operation or the decision-making process.

Especially under the current situation, in order to survive from the monetary crisis that is taking place in 1997-1998 in Asia, efficiency and cost effectiveness is crucial and must be adopted to run an effective businesses. To reach these goals, information systems, appropriating, must be applied under the circumstances.

An effective information system should be supported by infrastructures, such as hardware, software, and applicable applications. In developing the infrastructure that requires tremendous investment, some companies seem to be unwilling to make a meaningful investment in IT. Even though the corporations realize the continuous threat of competition becoming robust in the coming time, they prefer invest in core businesses, rather than investing in information systems. This situation occurs in middle-level and low-level businesses.

Another hindrance in implementing IT, is the individual or collective perception about IT. For various companies, like the government sector, they are resistant to IT's implementation because of their business culture and internal custom. If corporations implement a new system, they should first learn the new system. Doing so usually takes time requiring an expensive outlay of funds.

Nevertheless, acceptance of IT culture in Indonesia has not been satisfactory compared to five years ago. This impression may be observed from a recent IT magazine's article (Infocomputer, September 1996). In 1996, the IT market in the country has grown. Noted overall IT growth was 18.45% compared to the previous year. This was derived from a total of primarily (76.4%) hardware purchases and 10.5% in software purchases, including services of 13.1%. In the hardware sector, personal computer (PC) purchases dominated expenditure of 54% out of total IT budget overall.

Businesses, who were considered as traditional pioneers of IT, led the growth until 1997. Based on this statement, manufacturing and financial services are sectors that still depend heavily on IT, and they dominate the market for IT. Meanwhile, other markets such as government, education and family have not focused their resources on this technology.

Service sector (providers) and networking business have become a viable potential in the future, followed by the demand and efficiency that IT presents to the businesses. This is especially important in the outsourcing market developed within the past two years. Telephone banking that was released by one of the national banks in Indonesia is an example of outsourcing. By using outsourcing, customers do not need to invest money for hardware and software, as applications are handled by outsource providers.

In the last five years, "go public" has become a trend in Indonesia businesses. Because of this circumstance, companies pay attention only to their profit. They no longer consider to using assets in a specific business system as a good way to run their business. Comparison between asset and profit has become the main reason to determine the value of a business. So, outsourcing becomes the best choice for most companies. Hence, they outsource their data center and data processing to IT-specialty companies.

2. Investment

Generally, a lack of clearly defined and widely understood "rules of the game" has retarded the country's economic development. Consequently, a great deal of business activity in the private and state sectors remains clouded by ambiguity and uncertainty. For some firms, especially for the politically well-connected, these conditions can be a distinct advantage. This situation often occurs in developing countries, including

Indonesia. To date, the majority of Indonesians can not adequately respond to the current situation that caused recent changes in the political and economies of the country.

The existence of need for professional managers in Indonesia started from the influx of multi-national companies (MNC) in the late 1960s. At that point of time, a “New Order” under President Soeharto, widely-opened opportunities for foreign investors to invest in Indonesia. Under that policy, the government issued Constitution Law No.1 in 1967 concerning Foreign Capital Investment; hence, many MNCs invested capital in Indonesia. They did not bring just technology and their investment, but also brought management know-how to the business environment. They introduced various techniques of management concerning marketing, production, accounting, personnel, and others standard systems.

The MNC then created a new advanced management system and produced professional managers within Indonesia. Their existence in the businesses also delivered the country into a new management and new technology era. The new atmosphere gives opportunities to Indonesians to realize their potential and capability in managing. Some companies have improved their performance by adopting more modern management applications.

More entrepreneurs may come to invest in the many opportunities that business sectors offered in Indonesia. The fact is that the big four investor countries in Indonesia (Japan, Taiwan, Singapore, and United States), currently bring their management technology, including Information Systems, to support their business operation. Under these circumstances, there is encouragement for local IT groupings to take advantages of the technology transfer through investment.

3. Cultural Problem

The importance of the climate and economic environment for IT implementation is well known lately. However, equally important is the general educational level of society and its culture. Of course, in any society one may create "oases" of different custom, cultures, and technology. Such oases may function well, but by definition, their influence on the whole society would be limited (Jessica Keyes, 1993). The development and computer application is a product of western civilization. Anyone trying to implement them on a wider scale elsewhere must be aware of the potential problems arising from these cultural differences.

Since Indonesia is diverse, for any kind of generalization, the behavior of labor force applies primarily to Java and Bali, both over-populated islands. The labor force is predominantly rural, much of it with little experience of modern work organization, and with an attitude toward work shaped in the nurturing ground of village society. This climate creates a lack of the basic operational information; and a traditional suspicion of the new development mindedness (Penny & Gittinger 1970).

As described in Technology Transfer Review, a book about Indonesian managers, the managers tend to have a short-term horizon and lack a problem-solving mentality. There is more concern with avoiding disagreements and with mutual acceptability than with performance. Also, they tend to view technology transfer as a unilateral transaction, rather than as a complex participatory undertaking involving major transformation of organizations and behavior.

Before the MNC came to invest in Indonesia, the entrepreneur was alive and thriving in government. Among the private entrepreneurs, even the Chinese, there was a strong

preference for short-term gains, and for speculation rather than the calculation and continuity required for business investment. The bureaucracy was characterized by top-down authority and communication, with decisions being hampered by over-centralization and a lack of feedback (The next chapter will present how decisions are made, especially in outsourcing IT). Also, jobs tend to be graded on the basis of formal educational qualifications; public officials are hired on the same basis, rather than on functional responsibilities. Pay differences are not based mainly on performance, hence, promotion by seniority is emphasized over promotion by merit (Arndt & Sundrum 1975).

Through information augmentation worldwide, entrepreneurs in Indonesia are coming to realize that they have to change the classic atmosphere that caused the businesses to improve slower, if they remain in the same system. Also, from government perspective, there are substantial policy changes, such as the deregulation of the banking system (The effect of crisis), tax reform, bureaucracy, and investment policy. Under the current situation, the government gives greater emphasis on human resource development such as: education, health, manpower, clean water supply, nutrition, housing, and human settlement.

Changes can be seen in which Indonesian culture will approach a more modern-based system. The sequence of five-year plans reflects a consistent long-range view of the proper development sequence for Indonesia, and is expected to benefit the economy as a whole. Each plan is targeted to a particular sector that is considered as critical infrastructure. However, the technology share fell in the fifth term, where before it supported other sectors that had been planned. As a result, the coming of IT into Indonesian culture is welcomed and tends move faster than Indonesian readiness to adopt

the idea of rapid, continuous development. It is modern management's task to educate through knowledge transfer that is confirmed by foreign investors from various types of technology, one of which is information technology transfer.

Finally, as quoted from an article, this explains a distinction between Western and Indonesia culture in business. The article mentioned that Western cultures living in Indonesia are "Doers". This means they hold the belief that if people work hard, they will be rewarded. A look toward tomorrow for the rewards worked today. In contrast, Indonesian's believe that there is a natural order to the universe. Man need not strive for what is not destined to be; one should be content with one's place in the natural order. Therefore, the work relationship should be established into reciprocal understanding that: productivity; efficiency and goal setting are top priorities for all managers. The condition is becoming more commonly accepted, since many Indonesians attend school overseas. But for those who don't understand Western business culture, they should form an effective communication forum to erase the business cultural differences. Both sides must work through diligence, planning and hard work.

C. INDONESIA'S GOAL IN APPROACHING THE 21st CENTURY

A new millenium is coming in the next three years. A special time, a transfer from the 20th century into the 21st century. For those who give credence to symbols and myths, this moment becomes a time where special events will occur. For others, this momentum will become a stepping stone to do important things. Since there are two visions about the millenium, some people don't care and they consider this moment based only on the human time commitment (Edy Suandi Hamid, 1997).

Nevertheless, in approaching the 21st century, it appears humans believe in myths. The time transfer may be a coincidence-as a part of a continuous process- however, many specific examples could be compared to previous times in this event. With the technology leap in the late decade, it is difficult to draw an image of what will occur in the 21st century. New development in the era of "bio-technology" for instance, is presently echoing around the world that cloning probably will impact human life, to the world's order, and social life, for example.

A result from the continued world economic growth will be realized in the 21st Century. The most realistic, and close to happening, is economic globalization, which makes borders among countries undetermined. The paradigm of business competition in the era of the world's economy globalization has shifted. Technology sophistication produces metaphors, such as: interdependency, inter-linked, partnership, and networking. The impact is a win-win competition practice that allowed business to grow as they approach the 21st century (Tanri Abeng, 1997).

Indonesia realizes that information is very significant and needs to be indulged in a global information era. In one of President Soeharto's books about management, it mentioned that information is very important in making decisions, but he emphasized judgement and sensibility are also important in making "perfect" decisions.

1. Development Halt

Due to the monetary crisis recently in Southeast Asia, the idea of rapid economic development has created a national problem. The success of many Asian nations has been predicted as the world's fastest growing economies, has been falling especially Indonesia. This fundamental change drives Indonesia to restructure and deregulate its

system, based on demands and management skills. Many countries have been concerned about the crisis and have participated in giving hints and assistance. This phenomenon is not the end of Indonesian effort to develop its people's living standard from poverty, however.

Examining existing macro economy data and micro economy climate in Indonesia, shows that many fundamental problems and structures are confronted with the short term, as well as, long term. Existing problems are:

- a. Development fund and foreign debt
- b. Dependency and natural resources
- c. Precaution for free trade
- d. Corruption and bribery
- e. Social gap and racial
- f. Population and work forces
- g. Deficit and foreign transaction

Once the country can handle these problems, the development and economy might recover and development continuation might get back on track.

2. Some Strategies

Given there are many experts and economists who have suggested the best strategy to safeguard the country from crisis, it is very important to implement some strategies, because the core of the crisis is tightly attached to politics and confidence within Indonesians themselves. An important thing that must be examined and anticipated is the economic and social impact of the monetary problem.

With strategies to save this crisis, there are clues and recommendations from local and overseas economists. The government has listened to these suggestions and is trying to implement the suggestions in some sectors. However, this is not the best remedy in terms of the present crisis. After analyzing several facts that might cause the crisis, economists came to the conclusion that the most important thing to be done is correcting the management system and to support the system change by available beneficial technology.

If the government implemented one alternative to handle the crisis, such as, reformation, there would be the consequence of implementing a reformation policy toward employment in Indonesia. This policy caused substantial unemployment and a lack of confidence resulting in a decline in the local currency. According to the Center of Manpower and Development, an increase of open employment in 1997 was expected to rise to 4.6 million persons. This figure consists of 1.2 million persons who lost their jobs, including severance of employment and rationalization, and 1.01 million persons because of consolidation/merger of the financial and banking industry. This amount excludes 2.7 million of the younger generation that grand the employment market, a .6 million force that dropped out of formal education institutions, and .1 million workers, pupils and students, who were forced to return from abroad.

Many lessons have been learned from the process of saving the country from the current economic crisis. What and how the monetary authority should works; including the parameters and control structures. How are the techniques of transgression, and why those practices would be considered "right", or "wrong"? Through strong cooperation

among government officials, as well as, neighbor countries, economics will return to stability with positive growth.

3. The National Ideals

In facing any circumstances, Indonesian goals are relevant to national ideals that can be found in the first and second paragraphs of the Preamble of the 1945 Constitution. Fundamentally, the content of this paragraph is direct aspiration and a noble formulation. It plays the role in delighting life and becoming a spirit of the national life. It is the eternal guidance and the force resource of a national strength. From this national goal, Indonesia can simplify the nation's goal in approaching the 21st century by taking the idea of economic and social-political ideals. In this context, the social-political is not a discussed issue to be upraised, as economic issues are very important, because it contains the essence of the technology transfer and healing of many social-political issues.

Based on Indonesian economy perspectives, economy means all activities, both public and private, to management of production factors, such as land, natural resources, the labor forces, capital, technology, and management in production and distribution of goods and services for the sake of the people's physical, material, spiritual or mental welfare. (Defense and Security of Republic Indonesia' Dictionary, 1993)

Confidence in human progress remains strong within Indonesia society. Therefore, the majority of people believe that the human condition can continue to improve. Under this circumstance, the New Order's achievements in economic growth and development contrast sharply with its conservative, even static, approach to political development. However, the New Order has delivered increased prosperity to many, perhaps most levels of society, but the disparity in income and living standards between rich and poor has

reached a point where many Indonesians feel it is unsustainable, both morally and practically.

Much has been mentioned about how the country will achieve prosperity if all these existing circumstances remain in the society. Again, the people now are expecting and keep track of how the system might be changed. People are becoming critical of the government, especially the younger generation, because they can get information through technology that can not be protected or censored by the government. Through this rapid information system, people begin to realize there are needed changes in the economic system to rectify the disparity of living standards. Referring to the five-year plan, the government's continued sense of priority indicates hopes and expectations into prosperity. It is the contribution of technology transfer from overseas to Indonesia that will be most valued and most welcomed in approaching the 21st century.

II. BACKGROUND

Implementing IT is similar to new technology usage, if we are not familiar with it. Understanding and operating the new system needs an adjustment period, either by managers or users. In this chapter, the discussion will be on four major aspects that can be connected to the implementation of new technology. The four aspects are related to: technology development; how family business responds to technology; the framework that businesses have; and the importance of information in the competitive business climate. Overseeing this background in general terms is important for all to understand. Starting with technology transfer and development, as the most important in implementing this new technology, and how end users support this trend by examining the other three issues.

The nature of information is determined by its value to the user. It is the usefulness of this information that determines the success of a CBIS (Computer Base Information System). The information must be responsive to the user in four main areas: 1) it must be timely; 2) integrated with other data and information; 3) consistent and accurate; 4) and relevant. Information that lacks any of these basic features may result in incorrect decisions, misallocation of resources, and overlooked windows of opportunities.

Based on observation that was conducted for this thesis, most companies in Indonesia named their information system department as "EDP" (Electronic Data Processing). If the evolution of information technology was tracked, EDP has been applied to such structured tasks as record keeping, simple clerical operation, and inventory control. Meanwhile, the technology has changed into several classes of CBIS, such as: EDP, MIS, DSS, and EIS. Decision Support System (DSS) is to be discussed in

the next chapter, to give an understanding of implementing computer technology with the assistance of DSS, a supportive tool for managers in making decisions.

IT frameworks in some companies are different from one another according to thesis survey results in Indonesia. Each company has its own culture in framing organization and manpower, based on environmental factors.

Another important aspect for managers to adopt and manage IT is to know the life cycle of information systems. All involved need to be familiar with the four distinct phases of information systems: 1) introduction; 2) growth; 3) maturity; 4) and decline. Managers need to know these phases as a basic consideration in making any decisions that are directly related to information technology investment. For instance, if an organization has a contract with an outsourcing company and the contract is not meeting the organization's needs, it should be terminated. Because it might be in the maturity stage, the usage and reputation of the CBIS should be increased through quality and improvement of features, such as, graphics and external databases that provide greater flexibility and create greater user enthusiasm.

A. DEVELOPMENT AND TRANSFER TECHNOLOGY

Issues of process analysis, continuous improvement, the lure of technology transfer and the realities of technology development have been included in this thesis. In the following topic, the primary mission is to analyze the issue of technology transformation within developing countries, especially Indonesia. Another important part is to see how information system supports technology transfers in the country. Even though technology development mostly takes the risk of capital improvement funds, some efforts

have been developed for economic and public benefits, as the thesis has done in the area of research analysis of using technology in more developed countries.

The world is approaching the twenty-first century with a challenge of solving contemporary problems, while trying to achieve an unfinished agenda of the unknown future. Modern society must engage in a constant search for the good, in its quest for the better. For this purpose, Indonesia also has emerged as a major contributor in the modern world of high technology. If advanced countries are determined to maintain its present position as high-tech leaders, they must take the lead in harnessing the technological developments overseas, as well as, create a new high-tech culture that fosters the exchange of technological development for the advancement of all. (Prof. Shu-Park Chan, President of ITU February, 1994)

Technology is not limited to equipment and commodities, but includes know-how, understanding, and the ability to control and exploit the underlying principles and processes. There are many technology alternatives that can be developed and are related to the ability of human resources and fund. As a firm commitment, discussing the information technology transfer to developing a global system, especially for Indonesia with its large population, is also an important factor.

It's a fact that the country has been utilizing technology agency since 1991 and has been titled the Research and Development Technology Agency (BPPT). This agency is a non-departmental government agency headed by a Chairman. One of its functions is to control and evaluate the implementation of programs for applications of technology, and fostering activities for the transfer of technology (BPPT-DTEI Indonesia, 1994). As might be seen from the agency's functions, Indonesia pays serious attention in assessing

and applying technology. Since its existence, the agency has been studying the many applications that deal with technology transfer, including computer technology. In doing so, the agency consulted other nations, such as: Malaysia, Thailand, USA, China, Germany, and many others.

Although IT development is utilized in Indonesia's development program, it should be utilized through education and exchange with many advanced countries. Technology can be transferred through several ways because technology can be bought, borrowed, stolen, or developed evolutionary. Technology transfer is a poorly defined catch all-phrase for all activities and mechanisms, causing the movement of technology from the laboratory to the marketplace, or from one individual or organization-unit to another (Tamir Agmon and Mary Ann Von Glinow, 1991). As a result, the movement of technology is comparable to the movement of economy in general, which has been proved from what can be observed today in technology and the economy' world.

Much of the discussion on technology transfer seems to be based on the implicit assumption that the transaction costs of the transfer are zero or negligible. It is not always recognized that technology transfers, both through market mechanism and within a multination enterprise, involves heavy costs. An effort to understand the nature of these costs and then to minimize them, may be a much more beneficial avenue for reducing the technology gap than restricting foreign direct investment. The research chapter will examine some efforts to minimize the costs that have been assessed based on Indonesia's current condition. The result of these efforts may help managers who are responsible for technology transfer costs in corporations.

B. MULTINATIONAL CORPORATION VERSUS FAMILY BUSINESS

This section presents a review of two types of business environments, which have been involved in Indonesia for a decade. They are multinational corporations and family businesses. The basic characteristics of a multinational corporation is similar to a partnership or a sole proprietorship yet in other respects it does have similarities to a corporation. A family business is a business operated under familiar, well-established structures and procedures applicable to all corporations.

The review will cover technology impacts on the business development, especially the effect of information technology toward these two business's environments. How they survived from information technology growth in today's competition, as well as, in approaching the 21st century.

For developing countries, including Indonesia, the gap between its level of development and that of the advanced countries has been increasing lately. The country can not obtain a full utilization of human resources, technological facilities, and know-how, and financial support. The gap can be decreased by cooperation between education agencies, the industrial sectors, the banking system, and the government. How this climate improved in the information technology era should influence the business environment. Through this cooperation, both types of businesses may change their business atmosphere by implementing the technology that refers to their need.

The presence of multinational corporations has indeed provided for a positive climate for Indonesia. The environment has attracted local national companies and encouraged them to compete with multinationals. The local companies gained access to the

technology they needed either through technical assistance or by setting up joint venture with foreign companies.

1. Decisions in Multi Corporations Business

In accordance with its characteristics, multi corporations tend to be structured in such a way that the operations are four levels removed from top management at corporate headquarters. From the top down these management levels generally consist of corporate management; followed by international management; then regional management. This chain of command structure protracts and unduly complicates the decision-making process and tends to place ultimate decision-making power with those having the least knowledge and command of the information needed to make informed decisions. Yet, despite the problems involved, many large companies insist that even decisions requiring detailed knowledge of local circumstances be approved at the corporate management level (Tanri Abeng, 1997).

Another climate in multinational business is the “cook book approach to management”. Managing their businesses in a home country might be the same way they manage overseas. This approach is simply not effective in a country such as Indonesia. In Indonesia, deviation from the norm, and to effectively cope with this fact of business life, foreign businessmen must be flexible in their approach.

In this type of business, decisions are made based on the system of international controls and procedures prescribed by parent companies. This causes the critical decision being made to be quite slow compared to local companies. This, in turn, leads to intense competition in the consumer goods sector. It is true that all types of companies need to obtain a profit, but in this issue, national companies gain a profit through the existence of

multinational corporation which is advance technology in their business. Referring to a survey that had been conducted on several family owned businesses, they have been changing with the existence of multinational corporation in Indonesia through the management system, technology, and business attitude. A simple example was the usage of computers and the implementation of Information System (IS) in their businesses.

2. Family Business Decision Process

In this type of business, decision is absolutely controlled by the most senior position and mostly a family father, or the founder of the business. Therefore, innovations within the businesses move quite slow compare to multinational corporations. The development of a family business depends merely upon the most powerful person. Even though decisions are being made in this environment locally and quickly, it only gains a good competitive advantage in the consumer goods sector. In other sectors, the family business possesses a vulnerability in market competition, because of technology differences that can be found in multinational corporations.

Then issue is observing how information technology emerges into family businesses where it is mostly found in the Asia business environment-given its constraint in developing innovation to compete with other types of businesses. As a result, Asian businesses have strong relationships in decision-making and power, based on the amount of share in the business. Similar to multinational corporations, the executives in a business organization have more power in decision-making.

Technology emerges in a family business through hired managers who have a limited power in making decisions. As a result, those who have the "right" vision about business progress will suffer from getting results from their innovative, progressive ideas. Versus

the multinational corporations, this business type usually succeeds through the hard working of the entire family members, including the hired managers. Nevertheless, technology growth in the business might be slower than corporations where the decision to invest in other sectors is another way to gain more profit.

There are some detrimental aspects of a family business that are of concern. For this thesis purpose, related symptoms and pains will be presented in terms of the decision-making process; i.e.,

- Conflict or discord in the family members and/or business
- Dissatisfaction with how family members are performing in the business
- Concern about preserving family assets and security
- Shareholders not employed by the business who question management decisions
- Questions about fairness in compensation and position
- Confusion between family and business responsibility
- How to be fair to family members in/out of business
- Fear of differences of opinions degenerating into litigation
- Family members acting on emotion and not making good business decisions
- Difficulties with transfer of control and decision making (Family Business Institute, Inc.)

This pain and symptoms can be eliminated, or at least decreased, by applying better fundamental management. Most family businesses throughout the world have adopted a new system and have implemented new technology into the organizations. In other words, an understanding of the professionalization process must be examined both by

founder/owner and the hired managers. As a result, all stakeholders will have a better perception of doing business, especially in developing the organizational culture. Quoted from a family business consultant, “ the professionalization of the business should be considered as one of the most crucial elements of a successful plan. The sooner the professionalization process is recognized as a strategic objective for the family-owned business, the better the odds are for successful transitions for the family-owned business.”

It is getting to be more acceptable that family-owned businesses implement modern management within their organization. In a pragmatic sense, when a family-owned business is settled and well-structured, the role of IT will be strong in supporting improvements. Uniquely, much success is done by keeping business and family issues in a more traditional perspective. It requires hard work and a good business sense. Through information technology implementation any type of business, multinational or family-owned, should be able to compete, then to enlarge their organizations-nationally and internationally. This concept should be operational across the board, including Indonesian businesses.

C. IT FRAMEWORK

It is necessary to discuss IT framework because the issue can be one of consideration in making decisions for the corporations' benefit. Regarding the issue of technology transfer, foreign investment is normally a medium to accelerate the development process. Usually, a country will try to attract investors by providing information through all means of communication. Besides information, the actual data needs to be apparent in order to obtain more investor interest in doing business within the company's structure and grand strategies.

In developing countries like Indonesia, the way people do business is not different from people in other parts of the world. Yet, there is a uniqueness to the Indonesian style of doing business because of the different way of thinking and the cultural influence. Indonesians have a belief that humans were created based on natural evolution, therefore, they should learn from nature to be successful in conducting every activity.

The issue of framework needs to be considered as one model in decision making and in defining management problems that require deliberate thinking and the accomplishment of tasks. This technique has been used in IT organization to get proven results in the development of technology. As IT progresses, outsourcing IT in an organization needs a framework, besides methodology, and will be presented in the next chapter. Organizations in Indonesia also need to develop a formal assessment of its current situation. This assessment may identify a preliminary series of IT functions and IT architecture with a view to achieve the organization's goals, and quantify expected business benefits.

When designing and developing IT, an organization must first decide on the extent desired in developing a project by providing alternatives that might give optimum results, such as: framework, decision methodology, and fundamental process questions. The first part of the solution is defining the framework through a series of steps, such as the following:

1. Business Readiness

Activities targeted to provide a quick high-level of the business that requires improvement, the potential approaches for leveraging IT and techniques to meet the

needs of the business; recognition of the organization's receptiveness, and value principles regarding knowledgeable management.

2. Business Vision

Activities that focus on improving a specific business area through the transformation of business process (in this case technology transformation), the reuse of best practices, and the application of IT development techniques and solutions.

3. Solution Design

Activities that yield the detailed design of the solution to the business need, and the necessary input required to document the service level requirement and planning for deployment of the solution.

4. Solution Development

Activities associated with the actual development efforts required to produce and maintain the results, and the supporting initiatives required to prepare the organization to leverage the solution.

5. Solution Deployment

Activities designed to package IT solutions for delivery to the end users and to provide for ongoing support of the solution. (Taken from Gap Gemini News and Technology)

The above concerns modern business frameworks and establishes, primarily in advanced countries where supportive devices, such as high technology and human resources are available to achieve the desired results. For developing countries like Indonesia, besides accepting this framework to be implemented in project, there are other methodology to be taken into consideration and analysis, which are important in making

business decisions. Current business in Indonesia, after multinational companies emerged into the country's business environment, may have focused their business orientation into more modern management. As a result, this phenomenon has guided companies into newer technological practices and has integrated with millenium era processes of change.

D. THE IMPORTANCE OF INFORMATION

There is a saying that "information is power!" Information is an asset that can assist to overcome uncertainty and to open avenues for opportunity (Information and Publication Sbaonline, March 1998). Now, dealing with the current crisis in Asia, the success in overcoming the turmoil may be achieved through correct timely information. The impact of the crisis on Indonesia' businesses could be caused by lack of information, besides a weakness of its banking system and other factors.

From a business side, the global information age could affect the businesses for two reasons. The global characteristic of information, and the essential nature of information used by multinational businesses and government activities.

1. Needs for Information

First, information is inherently global; it respects no boundaries. As a result of its inherently transnational character, information has been the subject of some of the earliest multinational agreements, treaties, and organizations. Refer to the history of information, that the global information framework is so comprehensive, and the practical domestic and international information exchange is so great.

Most developing countries are information-isolated, and few can afford to update their knowledge bases. Today, Indonesia is no longer included in this group, since

technology transfer speed has been unprecedented in last decade. Nevertheless, there are needs for more open and effective information sharing, as well as, consultation with advanced countries in most fields and projects, particularly those entailing imported technology.

The new technology can transport information to wherever it is needed in efficient and responsive forms and to help maintain a link among colleagues, including those who may be the most informed thinkers and decision-makers working on a problem, but who are literally worlds apart (Bridge to Asia, 1996). However, if they lack equal access to the Internet and its knowledge resources, then users in developing countries like Indonesia will continue to be by-passed by IT development, and their information-isolation will increase.

In the next section, the cost of building a knowledge base will be discussed, since the costs of creating or updating this knowledge base by using traditional methods (such as building paper library collections) are beyond the reach of nearly all institutions.

2. Limitations of Network and Databases

In Indonesia, the capacity of many lines and link are low, and some local networks are limited in specific areas. Search tools let users browse databases and find answers to factual questions, but searches for general information can consume hours and money and produce a volume of data that needs to be filtered and evaluated further (even then, the searches may fail).

This limitation is not due to a weakness of the technology but to the control of information by the knowledge industry. That industry includes societies, universities, professions, and others who generate, process, or disseminate information. The role of

universities in technology transformation will be discussed to see how universities affect the development technology in general that includes IT. Another limitation is an access to technology. The price of hardware and software is beyond the means of most academics and professionals. Equipment issue is very important because today both hardware and software are supportive tools to build information and communication.

What has been presented in the first part of the thesis was mainly to give an overview of information technology in business environments, especially in developing country that is emerging into any existing technology. As an important part of technology development, IT is becoming more crucial in business competition in this decade. New IT and the Internet will make it possible to produce much of this knowledge, and conduct many of the exchanges that are needed, across boundaries and time zones at high speed and low cost. However, physical connection to the networks, by itself, is not enough to bring these benefits to the country. Therefore, once businesses and government decide to invest in information, they should make the information system accessible by any means of equipment and make their information contents fully available. Without this effort, Indonesia will remain information-isolated in the future, as it has been in the past, and research and development may suffer. With today's modern technology, everything seems to be easier, more convenient, and more profitable to use electronic tools to package information. This opportunity should benefit developing countries in transferring IT from advanced countries by lowering costs and by using the availability of information.

III. RESEARCH ANALYSIS AND OUTSOURCING

The main reason for conducting this research is to provide appropriate decision making in the managing of IT, with the goal to reach and inform profitable companies. Over the years, many parties have conducted such research and worked with clients to pinpoint the root of functional IT management (Everest Software Corp. 1996-1997). Observation has been conducted within Indonesia's corporations and the result performed a positive promise to the development of information technology. Adopted from managers, middle level employees, as well as direct users' viewpoints, the prospect of IT business in Indonesia will be applicable. As can be observed today, businesses and its environment are more complex today than ever before, and the trend is toward increasing complexity. Consequently, decision making indicates more complicated and difficult to decision-maker for several reasons.

- First, the number of available alternatives is much larger today than ever before because of improved technology and communication systems.
 - Second, the cost of making errors can be very large because of the complexity and magnitude of operations, automation, and the chain reaction that an error can cause in many parts of the organization.
 - Third, the information necessary to make decisions may be difficult to access.
- Finally, decisions must be made quickly (Efraim Turban, Jay E. Aronson, 1998).

An understanding of computer benefits start with an examination of the people's traditional working culture, which is rooted in the organization. After examining several approaches on the observation and a decision making process, it is clear that outsourcing might be the most important aspect to be taken in minimizing most corporations'

operation costs in terms of avoiding errors. Although there are a number of factors that can affect organizations' effectiveness and its efficiency, outsourcing is expected to give an optimum value in managing corporations in developing countries like Indonesia.

The fact is, many companies have the misconception that outsourcing is an all-or-nothing practice, but this is not the case. They can choose to outsource one or more IT functions, such as the company's desktop services, helpdesk or e-commerce operations. As circumstances change, the company may target additional IT areas to outsource, or bring others back in-house (Navin Mehta, 1997). The reason that companies want to outsource is to focus on its core competencies, so it follows that it should choose a partner who has a core competency in what the company wants to hand over.

A. SUPPORTIVE BASES

Each company has its own reason in adopting outsourcing. Some facts in the IT societies and research proved a significant finding, outsourcing consultants have shown to help managers make a decision in a full competition of vendors today. This circumstance will take place in the future. Methodology, which is provided to managers, is the most effective and up to date to be used as technology grows at a rapid rate.

Besides providing a significant return on technology investments and assets, outsourcing research ensures system accountability and availability, faster time-to-market, and more flexibility (Everest, 1996-1997). It also resolves the problem of rapid equipment obsolescence, so companies do not have to worry about purchasing hardware that depreciates in value every year. Although some researchers demonstrate how to outsource IT investment, other possibilities such as full purchase of equipment and upgrading are still under attention. The notion of probability will take effect only on this

option as to how to select outsourcing versus upgrading. Due to hardware constraint, upgrading only takes place when equipment has existed in organizations. Therefore, outsourcing is the only option corporations have to select. Criteria for this outsourcing selection will be demonstrated by looking for:

- A company with a strong IT reputation
- A company with good service capabilities
- A clear understanding of the company's business and operational requirements
- A company with leading-edge technology

Based on these parameters, a study of contractors holds an important role in determining factors to direct a strategy. The fact is, there are many vendors who want to provide services in IT business. In 1996, three companies—IBM, EDS, and CSC—dominated 65 percent of the top 100 worldwide outsourcing contracts (International Data Corporation, 1996). Undergoing this fact, Indonesia as a developing country also gets the impact of these big contractors. Nevertheless, all contracts being offered to corporations have some impediments to be implemented because of budget constraint. Corporations mostly consider investment on IT requires a tremendous amount of money and seizes cost for an uncertain profit, as they can see from rapid growth of any hardware and software. Since the growth of IT in the world has improved and Indonesian companies are well informed, the misperception changed, and they started to invest in IT by several options existing in the market (Buying, Upgrade, or Outsourcing). The options should go through a decision process by which they select the best option.

Managing outsourcing is not an easy task. Experts have found some factors that dysfunctional or unsatisfactory relationships cause some firms to withdraw from the contract (Keane, Inc. 1994-1997). This climate is absolute disaster for outsourcing companies. In order to avoid such unprofitable effects, there is a clue to outsource the company's IT functions. Whether outsourcing turns out to be the panacea it is heralded to be won't be known for another few years, when all the results are tallied (Jessica Keyes, 1993). So, those who are considering this option should be well aware that outsourcing is certainly not risk free, and in some situations, might even be a disadvantage. By conducting a detailed research using available tools, outsourcing will be dramatically change everyone's first priority. Before moving to the outsource organization IT, it is necessary to take a look at some thought-provoking questions in order to make a decision. As such;

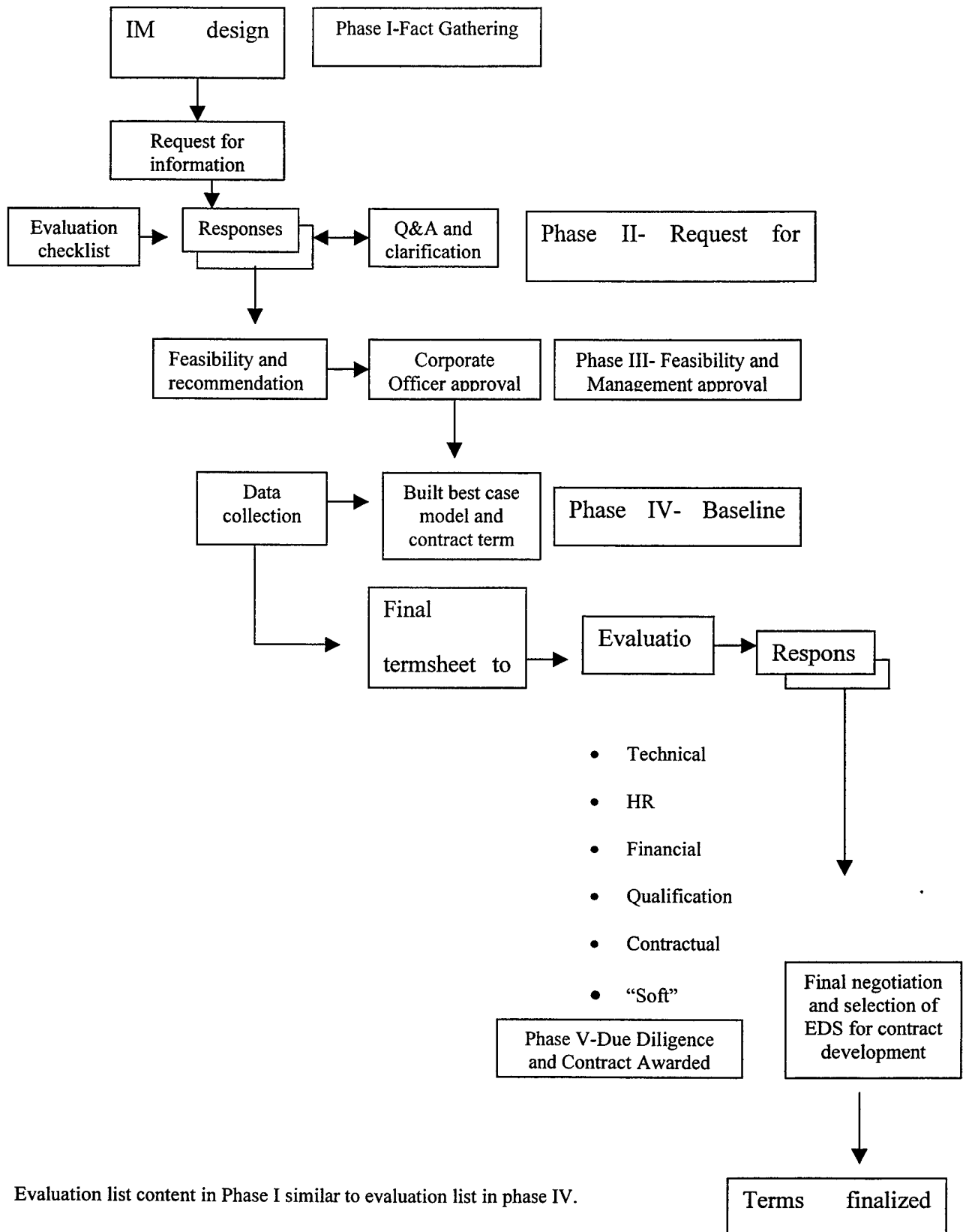
1. What is the real objective behind the push to outsourcing?
2. Will the company still be competitive after outsourcing?
3. Can the chosen vendor really do all that it says at lower cost?
4. What kind of checks and measures can be put into place to make sure the vendor is doing a good job?
5. Will the organization be locked into using only products that the vendor offers?
6. What part of the operation will be outsourced?
7. How many outsourcing vendors will the organization use?
8. If the organization decides to stop outsourcing, will the organization be able to get back on track quickly?

9. If outsourcing, will the organization be able to hire the technology people that needed internally?
10. What resource does the organization have if the outsourcer's equipment fails, with resulting damage to business?

These ten questions are supportive bases and assistance for managers to define an optimum result, and the best decisions toward the proposed option. Basically, the need of these questions could help them to formulate a decision model by using conventional models or smart software. The latter is growing so fast in IS society both in Indonesia and throughout the world.

On this mission, it is necessary to create a global outsourcing team to formally examine the benefits and feasibility of outsourcing. If outsourcing is found to be feasible, the team would find a partner and create a contract. Experiences have proved that one of the outsourcing benefits is rapid funding of new systems development and economies of scale and scope (Applegate, McFarlan, and McKenney, 1996). After examining several alternatives to be taken in outsourcing, the following process should be the most important to organizations in making decisions. The more detail an organization goes through, the more benefits it gets.

Model A-1. Outsourcing Process.



B. SYSTEM AVAILABLE (APPLICATION OPTIONS)

In order to learn more in depth about IT options, there is a need to know what types of networks can be applied to achieve an organization's goal. Since to outsource IT is not an easy task, managers should know which system is available and how the system works. To begin with, it is necessary to examine the supportive applications to implement new technology in an organization. In this case, telephone lines are very significant to be considered because this tool is the core of building a network within businesses. These are important concepts in developing IT and helps Indonesian managers to decide how to outsource their information system.

According to Post and Telecommunication Department data, the Indonesian telecommunication industry is undergoing a period of rapid growth, fueled by a rising standard of living, as well as, increasing liberation of company ownership and shareholding structure. In 1995, line capacity per 100 inhabitants was 2.58. This climate is expected to be better as the industry enters a dynamic growth phase. Besides discussing this matter, other important factors to consider are hardware and its suppliers.

Refer to this fact, how telecommunication performance in the country can be viewed and how should the system to be implemented, due to limited lines. This problem might be solved by adjusting IT's growth with telecommunication. Of course, it needs extra work and deliberate process. From Indonesia's perspective, this constraint is not considered as an obstacle, since the growth of telecommunication is very fast. The growth exceeds twice as many as demands for computers in corporations and home PCs (PT. Telkom Indonesia, 1997).

Table B-1

Indonesian Domestic Telecommunications Network				
	1992	1993	1994	1995
Population (in 000s)	184,063	187,008	190,000	193,040
Total lines in service	1,591,338	1,946,814	2,375,113	2,897,638
Lines per 100	0.81	1.03	1.23	1.46
Line capacity per100	1.07	1.60	2.03	2.58
# of public telephones	38,659	49,007	75,008	114,884
#of cellular subscribers	29,348	48,546	73,139	97,490

Source Telecommunication in Indonesia-P.R.R.

Besides the telecommunication factor, another significant factor holds an important role in the network system. In achieving this success, network systems are designed in the organizations to determine the success of entire departments. The following topology can be traced as key players in making decisions in connection with corporation's plans. There are advantages and disadvantages that each network has to be considered in applying the desired system.

1. Network Types

Two major types of network systems are available: local area network and wide area network. Local area networks (LANs) have received a great deal of attention in recent years. A LAN system connects peripheral equipment in close proximity. Usually, this kind of system is limited to a certain geographical area, such as a building, and it is usually owned by one company. Some systems, however, cover a broad geographical range and are still referred to as LANs. A LAN is usually a prerequisite for an automated

office. In an automated office, word processing, electronic mail, and electronic message distribution are integrated by means of a LAN system. Establishing a LAN system requires careful planning and a thorough assessment of the information needs of a particular organization.

A wide area network (WAN) system does not limit itself to a certain geographical area. It may be in several cities, states, or even countries. Usually it is owned by several different parties. As an example of a WAN system, consider a company that has its headquarters in Jakarta, and 20 offices in 20 provinces. With a WAN system, all these offices can be in continuous contact with headquarters and can send and receive information. Remote data entry becomes a real possibility in a WAN system. This system is really suitable for an archipelago country like Indonesia. The system enables the company to reduce cost in many aspects from travelling and conventional communication, as well as, shipping cost. Since the investment on this system requires a lot of money because it involves a number of parties, outsourcing might be taken into account.

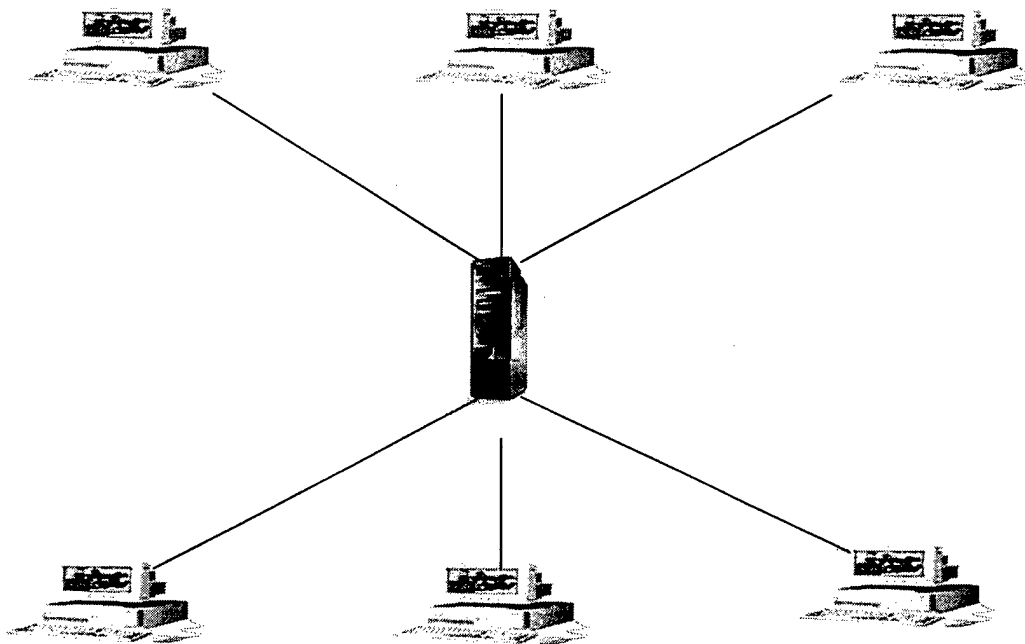
2. Network Topologies

Several architectures are used for a network system and each of these network topologies, as they are called, has its own advantages and disadvantages. Depending on the organizational structure, functions, and needs, one or several of these architectures may be implemented. The commonly used topologies are star, ring, bus, tree, and web networks.

2-1. Star Network

The star network usually consists of a central computer (host computer) and a series of nodes (terminals). The main processing power is supplied by the host computer. The breakdown of any of the nodes does not affect the operation of the entire network; however, if the host computer goes down, the entire network is no longer operable. The following figure is the basic illustration of a star network.

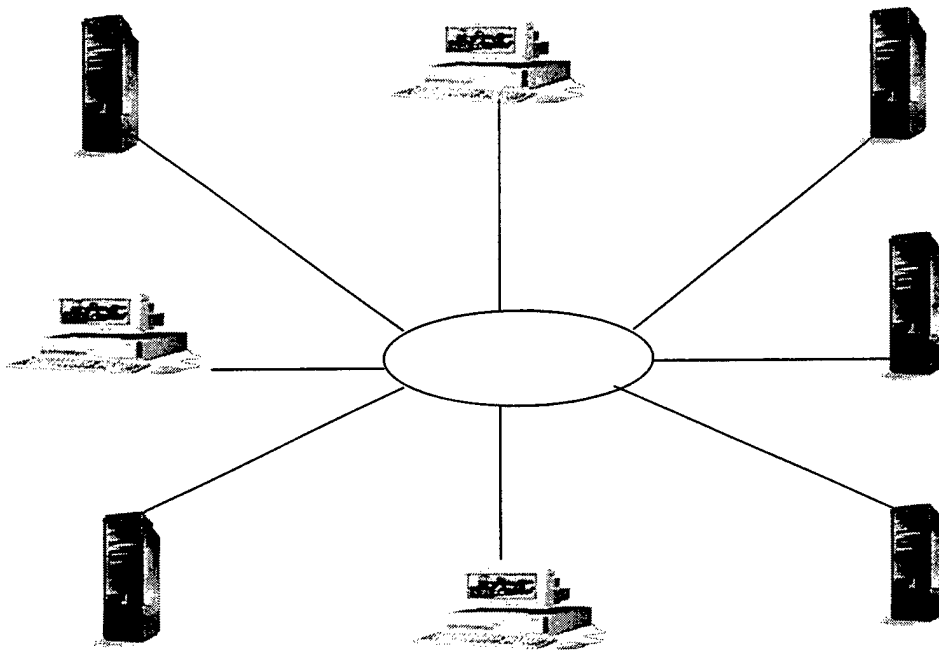
Illustration 2-1.Star Network



2-2. Ring Network

A ring network does not have a central host computer. A variety of computer and input/output devices may be used in this architecture. If any one of the nodes or computers goes down, the effect over the entire network is minimal.

Illustration 2-2. Ring Network

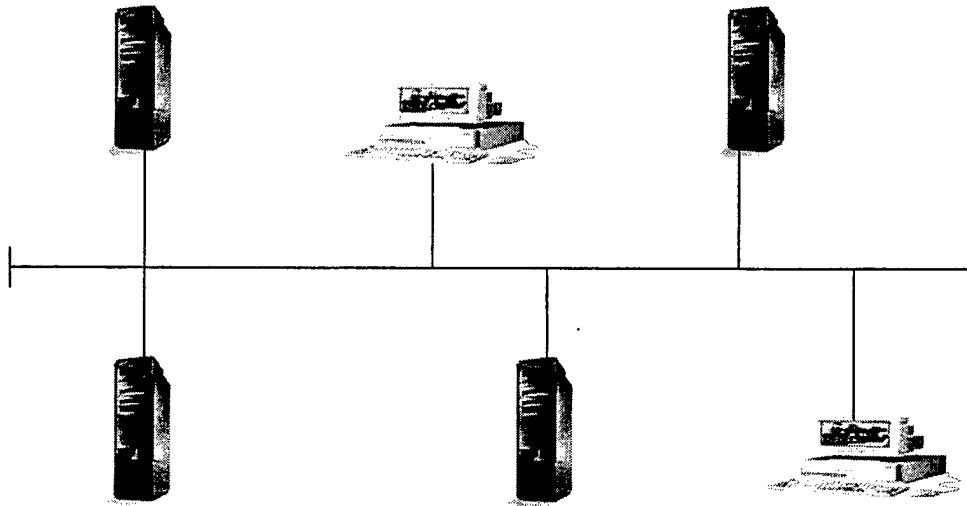


2-3. Bus Network

The bus network, which is commonly used in a LAN system, connects a series of different nodes. The failure of any of the nodes does not have an effect on any other node. This type of network is usually used for resource sharing in an organization. For example, a bus network can enable 20 PCs to use one high-speed laser printer or a hard

disk with 200 gigabytes (GBs) of memory. For developing country, this system seems to be preferable in the sense of budget constraint.

Illustration 2-3. Bus Network Illustration

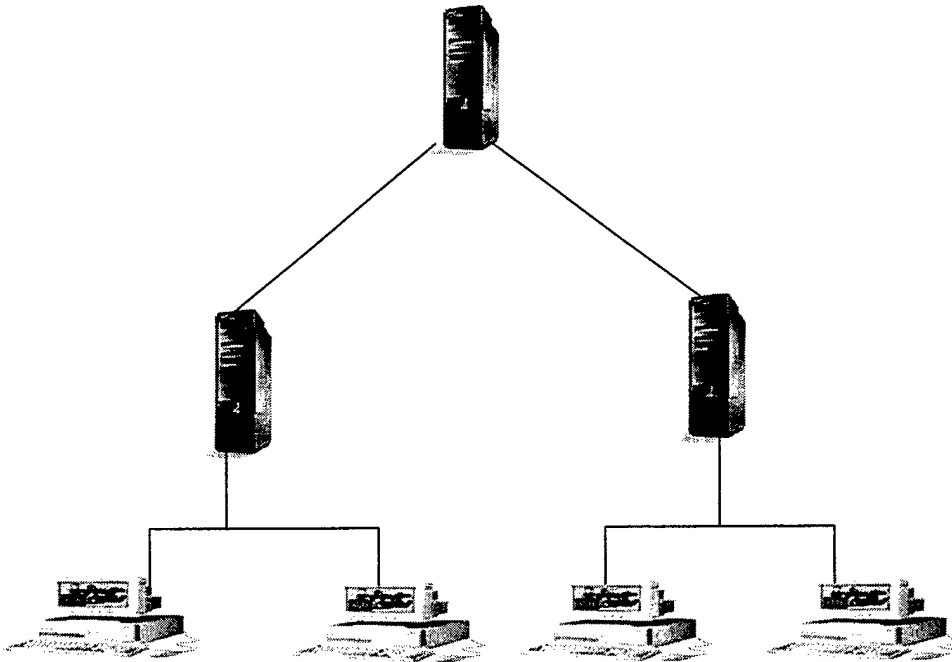


2-4. Tree Network

A tree (hierarchy) network combines computers with different powers in different organizational levels. This network may use the microcomputer at the bottom, minicomputers at the middle, and a mainframe computer at the top. Companies that are organized in a tree (hierarchical) fashion are the main candidates for this type of network.

Failure of nodes at the bottom may not have a significant effect on the performance of the entire network; however, the middle nodes and, especially, the top node-which has control over the entire operation of the network. These are extremely important for the network's performance.

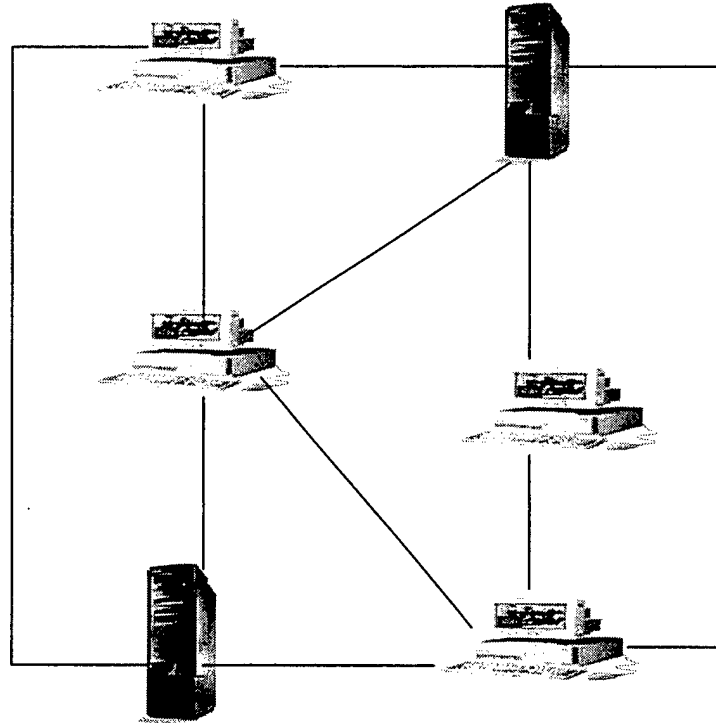
Illustration 2-4. Tree Network Illustration



2-5. Web Network

In a web network, every node (which may differ in size and configuration from the others) is connected to every other node. This type of architecture is the most reliable. Failure of one or a few of the nodes may not cause a major problem to the entire network operation. However, this type of architecture is costly and difficult to maintain.

Illustration 2-5. Web Network



From many kinds of network architectures, companies can choose the most suitable and affordable. Although this is not the only type of IT system the organization is able to operate, but communications have many applications to be considered in terms of a network operation system. The purpose of the above illustration is to give a basic knowledge within managers in order to establish a relationship to in-house or outsourcing. Basically, these types of networks can be expanded with more capability, since current technology provides sophisticated software or hardware. But again, budget constraint becomes a major issue in applying all additional devices.

Referring to questions from the previous sub-topic and network topologies, we can formulate a methodology of outsourcing by setting degrees of satisfaction. This criterion will be used as a basic formula to anticipate the future growth of IT. In other words, precaution for IT evolution, which is explained in the next sub-topic.

C. APPROACHES

The judgment of taking a specific methodology in outsourcing IT is minimizing the operation cost and budget constraints in terms of a developing country's need. Even though there are some methodologies that might determine maximum results of an organization's need, it is necessary to look at several approaches regarding some hindrances facing managers in developing countries today.

The research clearly shows that to achieve the best levels of client satisfaction, the outsourcing supplier must meet expectations of service reliability and consistency, while fulfilling this requirement reflects a deep understanding of the client's business. Therefore, many choices can be adopted in terms of taking final action to outsource. Again, as mentioned before, outsourcing is the best possibility to apply IT in organizations.

The key factor in a client satisfied, generally, is a reflection of good delivery. Based on KPMG's survey, these are the factors that can satisfy clients:

- Service Levels
- Efficiency
- Reliability
- Flexibility
- Communications

These are the kinds of ideal factors to be considered in reaching accountability for business outcome. But the objective to outsource is the better way to leverage technology, either long term or short term.

To be more specific, it is important to understand the main reason to outsource and the main goal to outsource. According to Outsourcing Institute, outsourcing is now recognized as a powerful tool for business growth. The business growth companies experience as a result of outsourcing, growth based not on investing in everything but on investing in the right things. It is growth based on specialization, on expertise, and on excellence. It is growth based on focusing on those areas that most directly contribute to a company's success, to distinguishing itself in its marketplaces, and to excelling in the eyes of its customers.

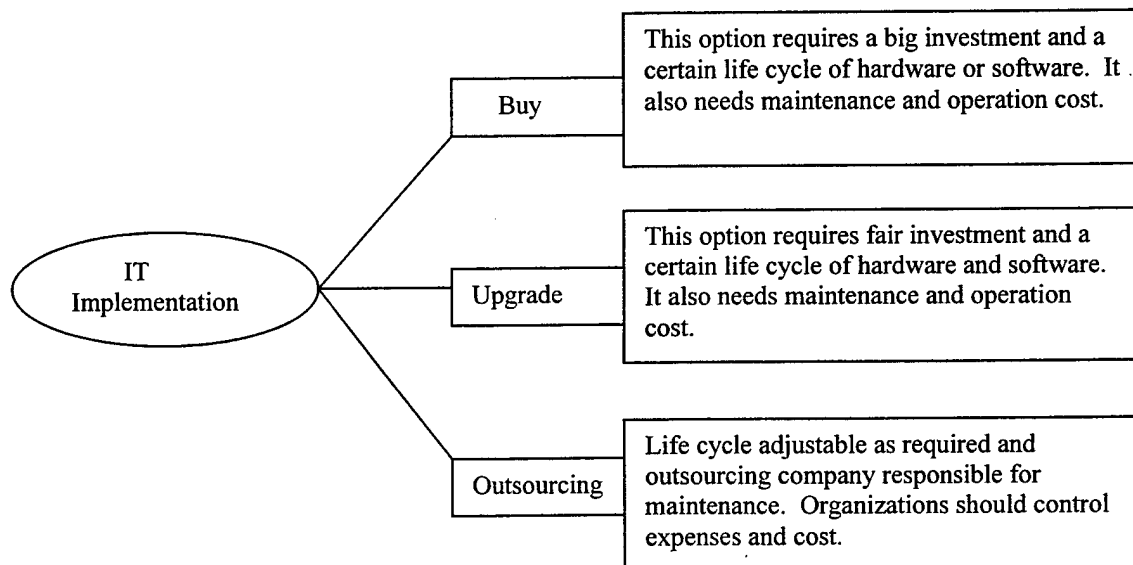
The traditional integrated firm is not the only, or necessarily the best, way to create value—especially in the global economy of the 1990s. Today, most organizations in Indonesia can gain access to outsource. What differentiates companies now is their intellectual capital, their knowledge, and their expertise—not the size and scope of the resources they own and manage. As a result, outsourcing needs to be adopted by firms from across the corporate spectrum. No firm is too large or too small to consider outsourcing. Fundamentally, outsourcing is clearly regarded as a plus for those companies seeking to gain a competitive advantage. For growing firms as in Indonesia, this is truly a good time to start or reconsider shifting their IS into outsourcing.

Today, IT applications are competing to attract firms in implementing expensive tools. The question is, are they ready to use and to invest their money to one thing they are not familiar with? Technology providers answer by offering user- friendly

applications, so that the firms will be easy to customize technology to their organizations' structure.

The reason for suggesting IS as an outsourcing is based on studies that have been conducted using decision tree methodology. In this study, there are three options to be considered in implementing IT (Buy, Upgrade, and Outsourcing). After these three options were placed on the decision tree chart, the optimum result was outsourcing. The following chart shows how the result was adopted.

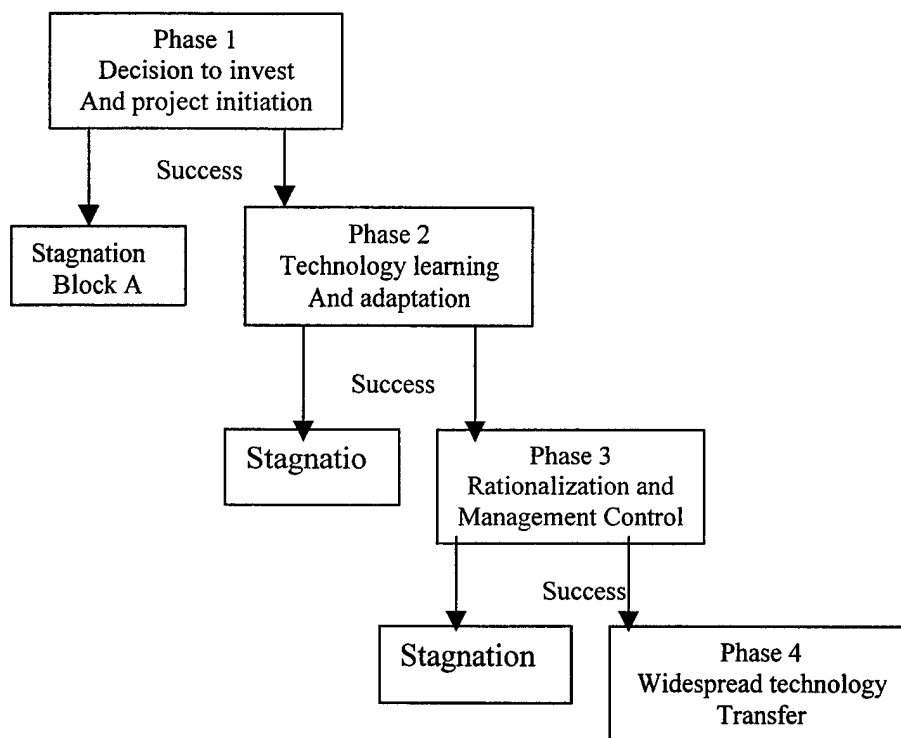
Illustration C-1



The decision tree is an alternative model for managers to choose in designing IT implementations. The following model is absolutely needed to design or to redesign IT challenge in today's business competitions. As a new technology for developing countries, this figure requires an ongoing commitment to managing the IT assimilation process. The assimilation process is the next stage of implementation of any technology, including information technology. This process has been characterized as a series of

tasks or stages through which a new technology is identified, assimilated, and institutionalized (L.Applegate, 1991).

Illustration C-2



Adapted from Cash and McLeod, 1985.

To assist in the decision making process, the following methodologies are the best choices, based on study and surveys on several Indonesian companies, as well as, all applications that are available in Indonesia's market. These methodologies, among many others, may reflect significant changes in the dimensions. All of the methodologies should be treated with caution; refer to the need of organizations or corporations because

of the many uncertainties, as well as, the often arguable assumption that underlie the results.

Tests have been conducted for several decision systems' software, which downloadable on the Internet. There are a number of consultant companies that can help manage outsourcing. But for a developing country like Indonesia where such systems are limited, it is judicious to use second proposed methodology. On these approaches, two kinds of methods are used such as: decision making software and economy evaluation.

1. Decision Making Software

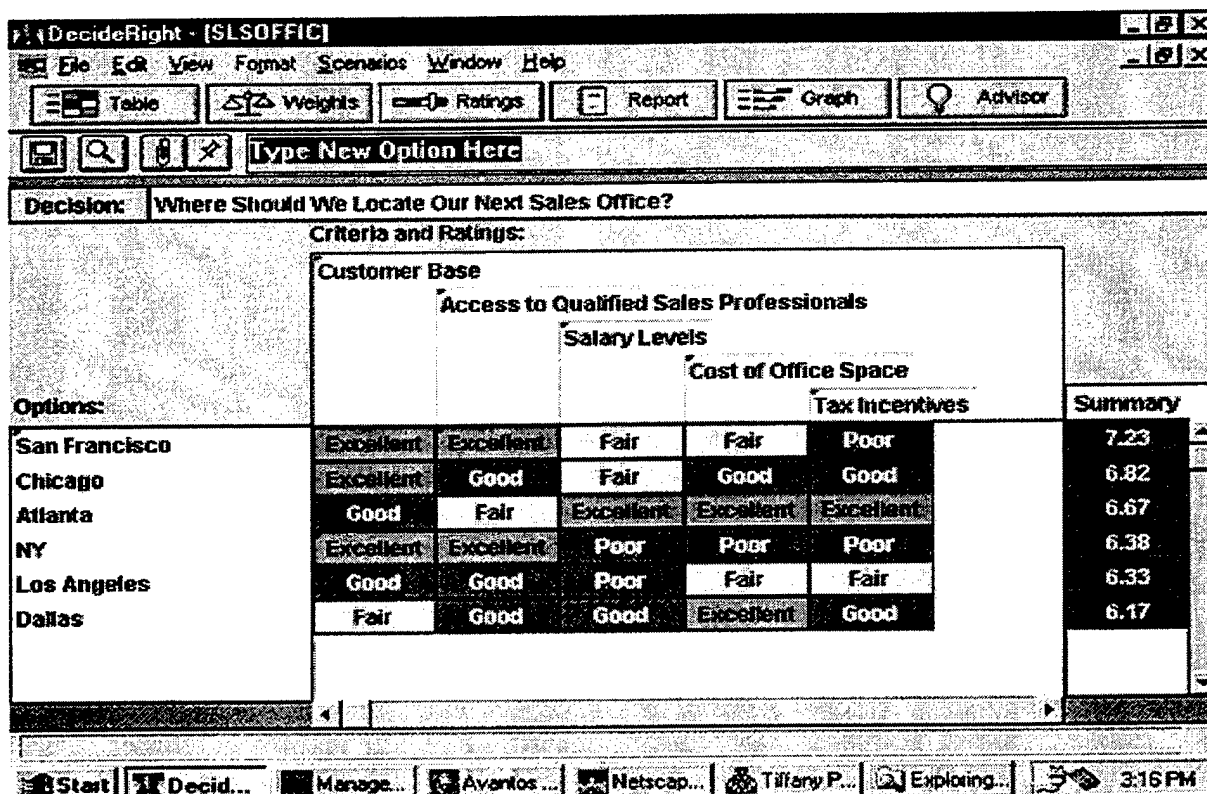
The most difficult tasks of modern management is strategic planning, because it involves all functional areas in an organization and several relevant outside factors (Efraim Turban and Jay E. Aronson, 1998). The outside factors can be constructed by natural or artificial sources. To assist the managers in planning and decision, there are artificial sources that can be used as supportive tools offered by consultant companies. They produce software to assist the company in making decisions with confidence.

As a matter of fact, a number of consultant companies produce such software. Since there is an abundance of similar software in the market, managers might be confused in selecting the best fit for their needs. By programming certain applications on the system, They can use them easily without special education or training. Given this remarkable innovation, they do not have to formulate mathematical equations, tables, or a specific standard to make a right decision.

It is not the purpose of this thesis to present the proposed software in making outsourcing decisions, but only to give an overview and comparison to the one with detail explanations (Economic Evaluation). Moreover, the result produced by this software will

not guarantee satisfaction for the user, especially for Indonesian managers, because most prefer using conventional, rather than sophisticated methodology, with budget and equipment constraint.

It is wise to compare one system to another. On this software, outsourcing team use the same selection and criteria in required spaces, such as costs, maintenance, optimization probability, system LAN's & WAN's, application development, mainframe data center, and training. Then they choose five vendors as candidates, in order to select the best one as recommended on the project. Based on reports produced by the software, it is obvious that this system helps managers in making decisions but it requires another additional cost if organizations want this technology. Not all companies prefer to take advantage of this technology, due to hardware availability.



Software sample from Avantos

Executive Summary

Based on a careful consideration of 7 major criteria for each of the 5 possible decisions that could be made, Microsoft appears to be the best choice.

The 5 choices considered were:

Microsoft
IBM
Motorola
Compaq
Siemens

The criteria used to evaluate the options were (in order of importance):

Costs
Application Maintenance
Optimasi Probability
System LAN's & WAN's
Application Development
Mainframe Data Center
Training

Of all of the choices considered, 4 were considered to be "top options." (A top option is defined as follows: If the choice immediately following the preferred choice is rated in the same rating category as the recommended selection, then all choices in that category are considered top options. If the second ranking choice is in a different category, the top options are considered to be the recommended choice plus all choices in the same category as the second-place option. Thus, the "top options" list will always have at least two choices in it and may include all of the choices considered in the entire table.)

The top options in this decision are:

Microsoft
IBM

Motorola

Compaq

Microsoft was the leading choice.

Relative strengths of all of the various choices in each of the factors is illustrated in the following graph:

Relative Strengths

Microsoft versus IBM

Microsoft was considered to be a better choice than IBM in 6 of the 7 criteria considered. Of these, the critical factor was: Training

IBM versus Motorola

IBM was considered to be a better choice than Motorola in 4 of the 7 criteria considered. Of these, the critical factor was: Costs

Motorola versus Compaq

Motorola was considered to be a better choice than Compaq in 6 of the 7 criteria considered. Of these, the critical factors were:

Optimasi Probability

Application Maintenance

After a careful evaluation of all of the criteria, Microsoft appears to be the best choice.

2. The Weight Sum Approach

The idea of this approach is to reduce a multiple dimension problem into "dimensionless." Figure merits for each alternative, and choose the one with the highest figure.

Mechanism used on the model as follows:

Step1: Establish a more or less exhaustive list of evaluation criteria.

On this step, a decision for four evaluation criteria to be measured, based on the needs of an organization such as: costs, maintenance, effectiveness, and performance. The reason for selecting this criteria is the methodology requires no more than four criteria. Pick four from the best criteria that might meet the organizations' need.

Step 2: Consider all feasible alternatives.

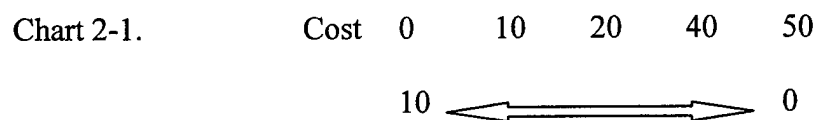
Refer to observations that have been conducted by on-line and interview observations, the big player vendors in Indonesia are Microsoft, IBM, Compaq, 3Com, Dell, HP, Motorola, Micron, Xircom, Oracle, ACT Network, ADC, NTT, Bosch, Cisco, Cylink, Siemens Nixdorf, and Digital. After reconsidering all alternatives, the top four vendors that use different technology and are familiar to most organizations in Indonesia. The vendors are Motorola, Microsoft, Oracle, and IBM.

Step 3: Investigate and assess alternatives according to criteria.

Assessing the criteria is difficult without doing detailed research. Therefore, by reaching an agreement based on step 2, each system has its own price. For example: Motorola cost 20K and IBM 22K. Documentation in Motorola is good, whereas IBM is fair.

Step 4: Assign a set of Weights to the evaluation criteria (generally adding up to 100) which indicate the relative importance of each criterion. Example: Cost = 25 % and Effectiveness = 50 %.

Step 5: For each criterion, assign a rating using a scale (generally on a scale of 0 to 10) as a point of reference.



For the criteria, each party has its own rating, based on familiarity of the system.

Step 6: For each alternative, multiply its rating with their respective weight.

It is given refer to party opinion, and it will be different one from another.

Step 7: For each alternative, add all weighted-rating to obtain an overall figure of merit.

Step 8: Select the alternative that has the highest figure of merit.

The following example might be used by organizations to make decisions in terms of outsourcing IS. Before defining the concept, decision-makers should figure out which vendors are more apt to outsource sample, and how decisions are made referring to business systems. Most organizations decisions hierarchy is a top-down process. And structures show two big parties in deciding every decision. Likewise in most companies in many countries, the top person has more power in decision making and orderly less downward. In this example, the outsourcing team defines only three parties involved in selecting a vendor. They consist of a president director, board of managers, and users. Using this methodology, the parties might have the same perception and result in adopting the decision. When the points are the same, it will be reselected based on the most powerful person or major decision.

Table 2-1.President Director' Opinion

	Weight	Motorola	Microsoft	Oracle	IBM
Added Cost	30	60	120	60	120
Maintenance	10	50	60	40	60
Effectiveness	40	240	240	200	240
Capability	20	160	160	120	160
Total	100	510	580	420	580

Table 2-2.Board of Managers' Opinion

	Weight	Motorola	Microsoft	Oracle	IBM
Added Cost	30	150	180	120	180
Maintenance	10	80	80	50	80
Effectiveness	40	200	240	200	220
Capability	20	160	160	100	160
Total	100	590	660	470	640

Table 2-3.Users' Opinion

	Weight	Motorola	Microsoft	Oracle	IBM
Added Cost	30	90	120	90	120
Maintenance	10	100	100	80	100
Effectiveness	40	200	240	200	220
Capability	20	100	100	160	100
Total	100	490	560	530	540

From these three opinions, Microsoft appears to be the leading candidate. Although on the president director's opinion, Microsoft and IBM are superior to other candidates, Microsoft is considered the top candidate. If there were two leading candidates, use the second selection process through additional criteria to select candidates.

D. INFORMATION SECURITY ISSUE

Given the alternative, which is presented in this thesis, it would become very crucial for decision-makers to consider to outsource corporation's IT. One issue that they can not avoid is the information security issue. As information systems become increasingly distributed across organizational and geographic boundaries, the task of ensuring information security becomes more complex. In addition to the distribution of information technology, information security managers also face the challenges presented by outsourcing of information technology management and operation, computer operations, and/or application development.

As techniques of information security advance, responsibilities must also include maintaining the usefulness of information as well as its availability and ensuring the authenticity of information and integrity. This sub-topic analyzes the required functions and suggests how the responsibility may be delegated throughout a company that has significantly decentralized its information systems resources. In the case of outsourcing, any delegated responsibilities must be explicitly set forth in the outsourcing contract and deliberately considered as one important aspect when starting the contract.

Although several vendors have set up organizations that are prepared to come to the aid of any of their customers who find security holes or attacks, this is not a guarantee for corporations ignoring security information within their businesses. Managers need to be aware of any jeopardy, as long as they implement information technology, one of which involves computer applications.

1. Risk Acceptance Process

A basic premise of risk acceptance is to keep control of security in the hands of business managers. This ensures that security serves the corporation's business needs and is not arbitrarily pursued for its own sake. It is a clearly stated risk acceptance process that ensures that this principle is maintained (Louis Fried, 1995).

The issue of risk acceptance is necessary to be explored in this thesis, because the decision to accept the risk totally relies on managers and their understanding of standard control, according to a structured process. This process ensures that managers understand the levels of risk and has a sufficient reason for accepting the risk in corporations which outsource its IT.

Correctly executed, risk acceptance procedures justify variance from the standard control, yet keep the risk within the scope of company policy. It also ensures that when a decision is made against security controls, it is not made for expediency's sake but out of a sound business judgement of risks and costs, keeping security in the service of business.

Normally, there are many issues that can be exposed in terms of outsourcing projects. For the purpose of thesis analysis, it is merely a decision component when the corporation decides to outsource any of its business operational. The next issue is also important to be included in any business operation and management.

To be more specific, the following example may provide clear understanding of risk acceptance. One of the ports in Indonesia (Tanjung Priok) recently implemented the usage of Electronic Data Interchange (EDI) with the purpose of operation effectiveness. Contrary to what the management expects from its implementation, EDI failed to make

the system run well. The basic reason of the failure was the management did not take control on the detail implementation process, as well as, risk consideration. As the risk acceptance process ensures this error can be prevented, the management had to redesign its organization, in order to control all management systems based on the risk of implementing such technology. The management should have learned from a country that has been successful in operating this technology such as Singapore.

2. Information Security Policy Consideration.

Under the allocation of responsibilities described, the application owner makes all the decisions about the security of the applications and information assets that support the owner's business function. However, these decisions are made within the context of an overall information security program structure that defines levels of sensitivity, organizational responsibilities, control standards, and risk acceptance procedures.

Not only companies that outsource its IT, but also companies which run any information technology needs to determine what classes of information best meet its business environment. The following are some suggestions that various companies may implement:

- Restricted - information that is highly sensitive and should be disclosed only to persons specifically authorized by name.
- Private or confidential - information that is sensitive and should be disclosed only to those with an identified need to know it.
- Internal - information that, though not sensitive, is not intended for public release.

- Public - information, such as marketing information, that is specifically intended for release to the public. (Deborah Russell and G.T. Gangemi Sr. 1991)

In general, the structure for information security responsibility in a decentralized environment, such as in Indonesia businesses, or where some facilities are outsource, need a guideline and should follow a certain process to ensure that security issue are included in their decision processes.

The increasing distribution of information systems processing, the widespread use of WAN and LAN in Indonesia businesses, and the use of outsourcing for information technology management and major computer operations are demanding a response that enables companies to protect their information assets and their ability to continue normal business operations. This response can only be implemented through an appropriate organization of responsibility for information assets protection and deliberate decision processes.

IV. CONCLUSION

Much has been discussed about business environment and the possibilities of establishing business connections in Indonesia where it benefits foreign and local investors to invest in technology, especially information technology. By understanding this circumstance, opportunity opens to reduce cost, avoid errors in building or continue management in the competitive environment.

Many methodologies that have been proposed, and there are several critical points managers should consider in making decisions. Studies should be conducted before taking action, then following the existing standards in the organization.

As the framework is evaluated and weights are assigned according to factors, which have the most success and are most significant, this alternative is considerably accepted in developing country's organizations and meeting their overall needs especially outsourcing the IT. The reason is because Indonesian companies in this era are committed to refocusing and doing more with their core business. It is understandable that this phenomenon is like a moving target; therefore, there has to be adaptability of change on both sides of the outsourcing arrangement. Additionally, this action might be suitable for all companies, as well as government offices, since the country is experiencing a monetary crisis. The issue of effectiveness and efficiency must be the top priority for all committed businesses in Indonesia.

A. SUMMARY

Many alternatives have been demonstrated by IT vendors to promote their product and to attract consumers into outsourcing, but corporations should take some action beforehand to prepare their businesses in outsourcing investment. The alternative

presented in this thesis is to help managers determine what should they do to prepare their organization, as well as staffers under their management. It is necessary for IT managers to know some alternatives, instead of taking only one alternative when the board decides to share their assets in Information System.

For corporations in Indonesia, a number of company's managers have been instrumental in creating outsourcing agreements for the following reasons:

1. The difficulty of managing complex functions, such as communication because of the business separation.
2. Concern about buying costly technology that could rapidly become obsolete.
3. The difficulty of obtaining and retaining high-caliber information technology specialists.
4. Temporary outsourcing of old systems to permit concentration on migration to new-generation systems.
5. Internal staff without the capacity or skills to undertake project.

Even though the corporations have decided to outsource their IT, they have to keep in mind that contractors are not their pure business partners. They are separate firms that must maximize profits to satisfy their shareholders, and as a result, their business interests cannot be congruent with those outsourcing firms. Appropriate preparation, intelligent bidding and methodology procedures, the advice on contracts, and strong performance monitoring are needed to make the outsourcing a success (Louis Fried, 1995).

The pace of introduction of information technology capabilities continues to create new threat possibilities. Therefore, corporate managers and information security

specialists need to be aware of these threats before adopting IT, so that they can take adequate countermeasures. And as a response to the security issue, Indonesia's companies should implement an appropriate process of responsibility for information asset protection.

B. RECOMMENDATION

There are problems that can be found in IS outsourcing, such as savings evaporating through extra charges unforeseen in the contract, and cash being raised as a short-term measure, following several methodologies and deliberate consideration will focus their organization to gain profit, flexibility, and effective business. This thesis can reduce many unnecessary procedures for managers while making decisions, so they can be more focused on the outsourcing issue.

The thesis gives an alternative both for foreign and local investors an explanation about targeted countries in technology investment. By understanding investment laws, formal culture, and the opportunity that Indonesia offers to investors, the possibility of obtaining success becomes closer to maximum. Having some constraints that investors might face in the future, the thesis provides necessary information before starting businesses in Indonesia.

BIBLIOGRAPHY

Adam Schwarz. *A Nation in Waiting: Indonesia in the 1990s*, Westview Press USA, 1994.

Applegate, McFarlan, McKenney, *Corporate Information Systems Management: Text and Cases*, Richard D. Irwin, a Times Mirror Higher Education Group, Inc. company, 1983, 1988, 1992, and 1996.

Arthur Andersen, *National Survey Finds American Family Business Turning to Information Technology*, Chicago, Oct. 2, 1998.

Charles T. Stewart, Jr. and Yasumitsu Nihei, *Technology Transfer and Human Factors*, D.C. Heath and Company, 1987.

Carey, Jane M., *Human Factors in Management Information System*, Ablex Publishing Corporation, 1988.

Don Schwerzler, *Professionalizing the Family Business*, Industry Innovations Inc. 1996.

Efraim Turban, Jay E. Aronson, *Decision Support Systems and Intelligent Systems*, A Simon & Schuster Company, 1998, 1995, 1993, 1990, 1988 by Prentice-Hall, Inc.

Hossein Bidgoli, *Modern Information System for Managers*, Department of Management California State University, Bakersfield, California. 1997.

Jessica Keyes, *Infotrends: The Competitive Use of Information*, McGraw-Hill, Inc. 1993.

Louis Fried, *Managing Information Technology in Turbulent Times*, John Wiley & Sons, Inc. 1995.

Dr. Mohtar Mas'od, *Kritik Sosial Dalam Wacana Pembangunan*, U.I.I Press, Cetakan Pertama, Dec 1997.

Navin Mehta, Business Center, Technology News. Singapore Press Holding, Dec 1997.

Tanri Abeng, *Gagasan, Wawasan, Terapan, dan Renungan*, Pustaka Sinar Harapan, Cetakan Pertama, 1997.

Tamir Agmon and Mary Ann Von Glinow, *Technology Transfer in International Business*, Oxford University Press, 1991.

Zeinab A. Karake, *Technology and Developing Economies*, Peager Publishers, New York, 1990.

National Defense University, The Information Age: An Anthology on Its Impact and Consequences, Washington D.C., June,1997.

The Web-Enabled Enterprise, Gap Gemini News and Technology, Feb 1998.

Open Computing Magazine, Volume 12, Number 3, Mar 1995.

Clarity Development, Inc. Home Page, <http://www.clarity-dev.com>, Nov 20,1997.

Telecommunication in Indonesia P.R.R.' Home Page. <http://pacificrim.bx.com/telecom>

Embassy of Indonesia in Ottawa Canada's Home Page. <http://www.embassy.go.id>, Jun 18, 1996.

InfoServer, The Journal for Strategic Information Service Providers. <http://www.infoserver.com>, Aug 1997.

BCO/Marketing Communication, Business Insight-Sep 1996
<http://www.bizinsight.com>

Transfer Stations for Developing Countries in Asia, Bridge to Asia, 1996.
<http://www.bridge.org>

The Disciplines of Outsourcing: A Panel Discussion, The Outsourcing Institute, May 15,1997. <http://www.fortune.com>

Financial Times Review; Information Technology Section, page 2-9, Wednesday, Jan 1998.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center2
8725 John J. Kingman Rd., Ste 0944
Ft. Belvoir, VA 22060-6218

2. Dudley Knox Library2
Naval Postgraduate School
411 Dyer Rd.
Monterey, CA 93943-5101

3. Indonesian Armed Forces Headquarter1
ATTN: Asisten Perencanaan Umum
Mabes ABRI Cilangkap
Jakarta-Timur
Indonesia

4. Indonesian Army Headquarter1
ATTN: Paban II Spers AD
JL. Merdeka Barat
Jakarta-Pusat
Indonesia

5. Dr. William James Haga1
Department of System Management
Naval Postgraduate School
Monterey, California 93943

6. Prof. Lee Edwards1
Department of System Management
Naval Postgraduate School
Monterey, California 93943

7. Capt. Minan Sinulingga3
Jl. Cendrawasih VI/62
Pesanggrahan Bintaro Kodam
Jakarta-Selatan 12320
Indonesia

8. Capt. M. Andika Perkasa1
Norwich University
10 Washington St.
North Field, FT 05663